



**CEMENT
MANUFACTURERS
ASSOCIATION**

Sectoral Challenges and Opportunities for CCUS in the Cement Sector

October 12, 2023

The Hotel Imperial, New Delhi

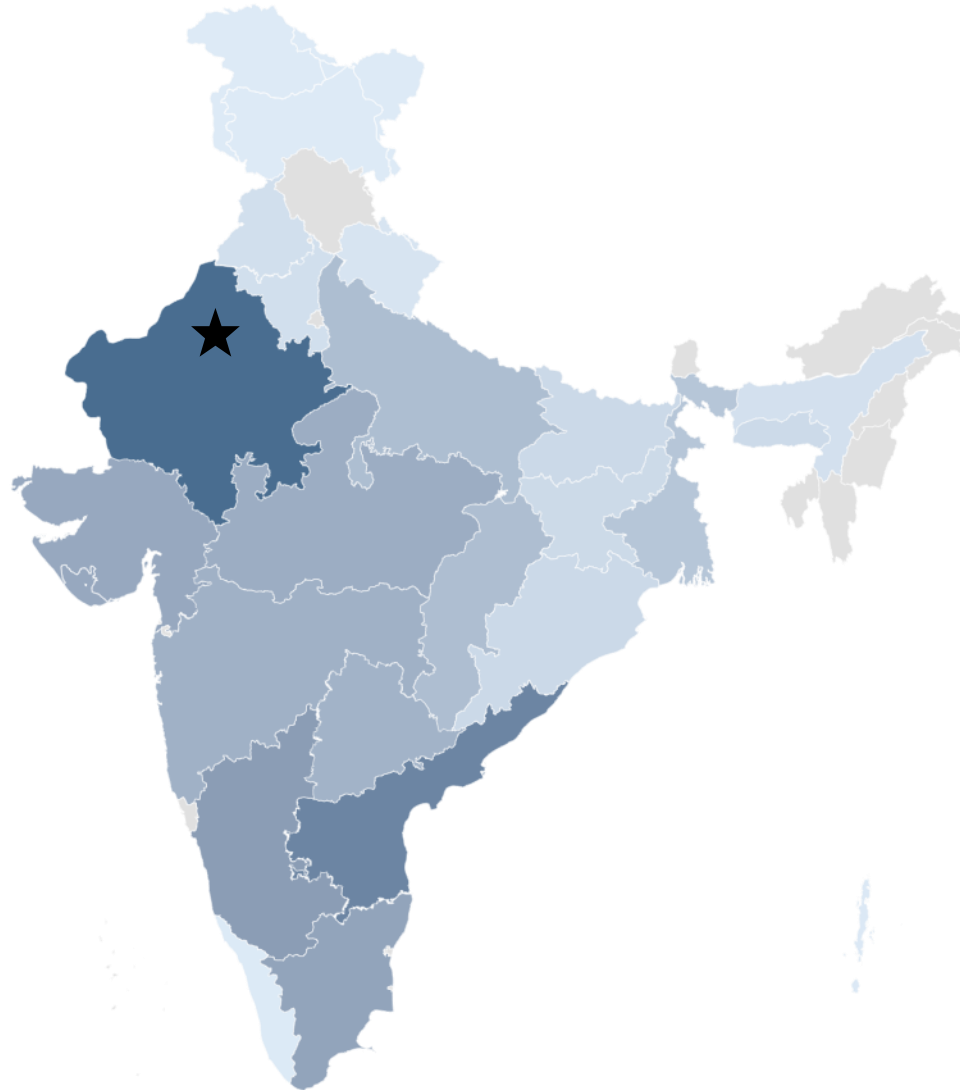


- **About Cement Manufacturers Association (CMA)**
- **Cement manufacturing process: Carbon and Energy footprint**
- **Cement Industry: Emissions Profile and Highlights**
- **Indian Cement Industry: Efficiency Initiatives**
- **Present Scenario: Recommendations for an Enabling Environment**
- **CCUS: Present Status**
- **CCUS: Recommendations for an Enabling Environment for the Indian Cement Industry**

About CMA: 37 Member strong | ~ 80% of All India Installed Cement Capacity



All India Installed Cement capacity 640 MTPA, 2023-24



★ CMA Office

Sectoral Committees



Policy Platform



Voice and Networking



Information and Publications



Events



Global Partnerships



Legal Opinion



Advocacy

Source

All data are approximations.

Illustrative Map of India based on IBM Indian Minerals Year Book 2018 accessed on April 4, 2023ty

Installed Cement capacity: 2015-16 till 2017-18: IBM Indian Minerals Year Book 2018, 2018-19 till 2022-23: Survey of Cement Industry and Directory 2019, IBM Indian Minerals Year Books , annual reports, company websites and media reports accessed on April 4, 2023



Per Capita Cement Consumption
India <250 kg
World Average >500kg
Cement demand and consequently the emissions would increase

Cement Demand Projection (FY23-FY28)
CAGR- 4.5-5.5

To reach 495-515 MT by 2028

Cement plants are at geographically distant and remote locations

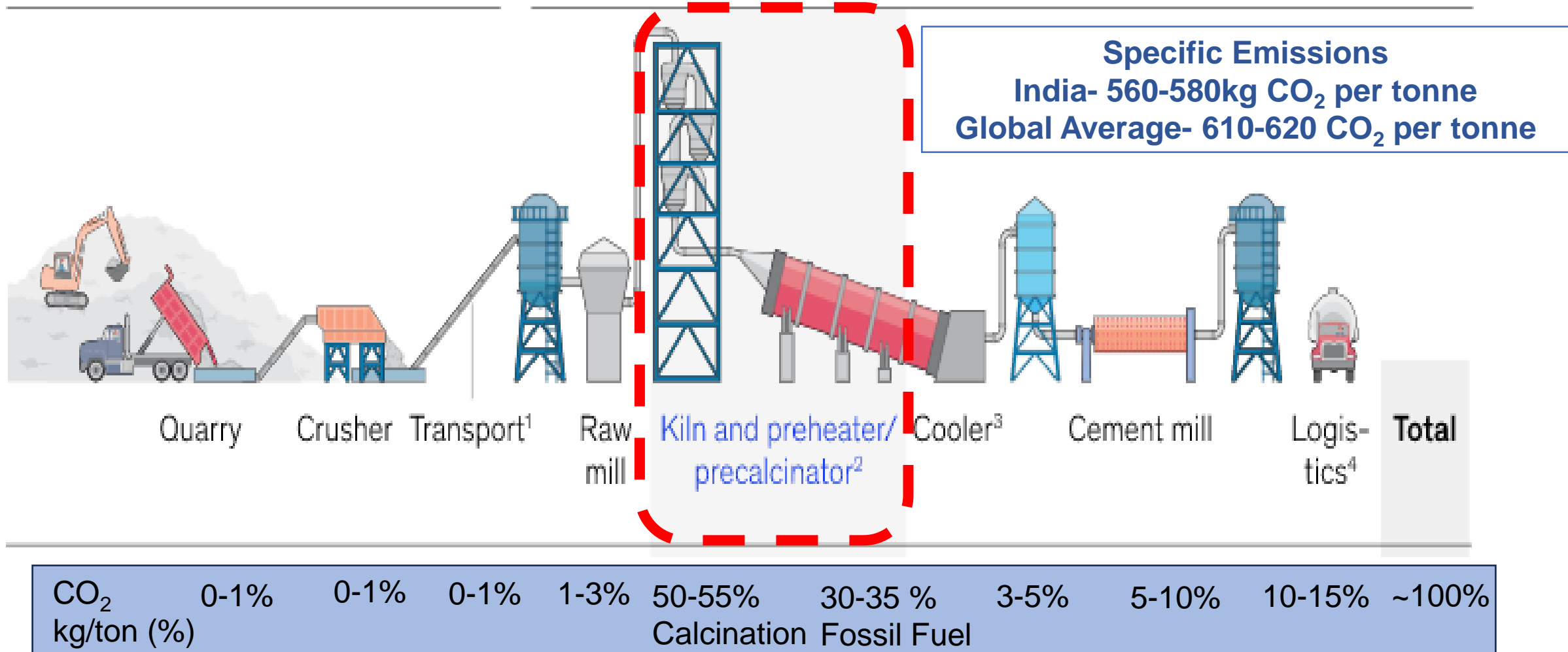
There are no existing facilities and demand for Utilisation and Storage

Cement manufacturing process: Carbon and Energy footprint



Raw materials, energy,
and resources

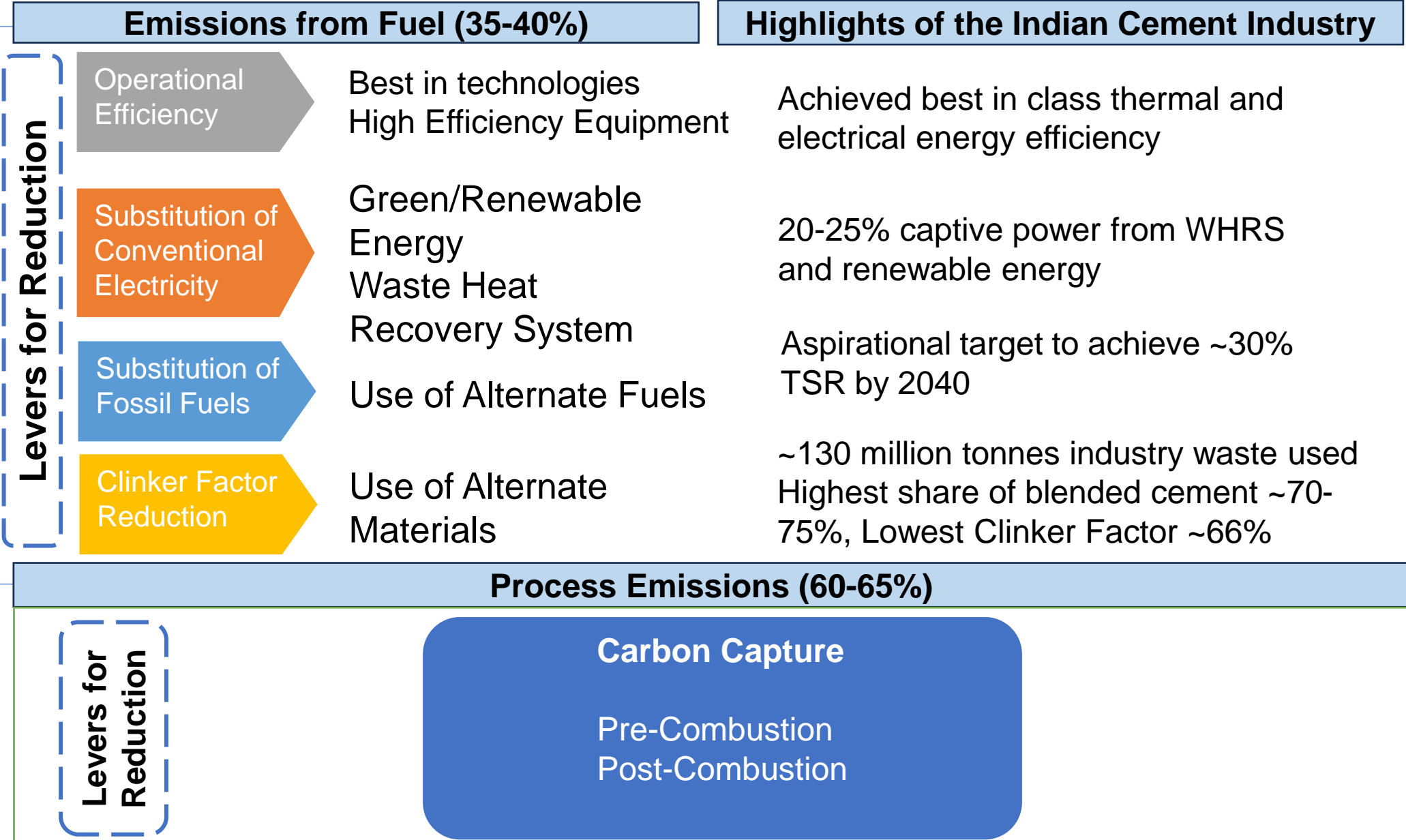
Clinker and cement manufacturing



Cement Industry: Emissions Profile and Highlights



Emission Profile of the Indian Cement Industry



Indian Cement Industry: Efficiency Initiatives



Use of Alternate Fuels and Raw Materials

Indian Cement Industry has been at the forefront of using Alternate Fuels and Raw Materials

Alternate fuels

Consumption of industrial hazardous and non hazardous liquid and solid waste, MSW (Municipal Solid Waste), RDF (Refused Derived Fuel) and Agricultural waste, Biomass, Biomass pellets, RDF pellets etc.as **alternate source of thermal energy required for kiln**

Benefits of Alternate Fuel

- Substitution of fossil fuel and reducing carbon footprint
- Promoting circular economy
- Sustainably coprocessing waste streams in cement kilns

Aspirational target to achieve ~30% TSR by 2040

Alternate raw material

Alternate raw material plays decarbonisation role in two stages i.e. clinker raw mix and cement grinding.

Alternate material

Red mud, fly ash, slag (ferrous/non ferrous), pond ash, calcined clay, FGD gypsum, Phospogypsum, chemical gypsum

Decarbonisation effect

- Limestone conservation
- Waste utilisation from industry
- Reducing carbon intensity reduction by clinker substitution

Present Scenario: Recommendations for an Enabling Environment



- Mandatory usage of blended cements
BIS to formulate performance based cement standards to minimise the consumption of clinker and limestone and reducing the carbon footprint of cement industry
- Ban on export of clinker substituting materials, which have huge decarbonisation potential and help in conservation of natural resources (slag, fly ash, pond ash, FGD gypsum, chemical gypsum and cement grade clay)
- 100% Fly ash and pond ash to be allocated to Cement manufacturing: best alternative for decarbonisation.
- Freight subsidy for Supplementary Cementitious Materials (fly ash, slag, gypsum, red mud, kaolinite clay) movement by Rail
- Availability of high grade domestic coal for Cement Industry to absorb higher quantity of supplementary cementitious materials
- Extension of RE power benefits to power generated through WHRS
- Source segregation of MSW and production of cement grade RDF to reduce the fossil fuel consumption in the cement kilns. Priority or right of refusal to be given to cement industry for utilisation of RDF.
- Adequate quantity of cement grade clay to be made available to Cement Industry. Mapping of clay deposits needed

CCUS: Present Status



Carbon Capture

- i. Increase use of alternate fuel
- ii. Oxyfuel combustion technologies

High cost

CAPEX - INR 1,400 Crores for 1 MTPA of carbon capture plant

OPEX - INR 3,000-4,000 for 1 tonne of carbon capture

Projects underway in EU, Canada and Australia
100% Funded by Government

Focus Technologies for Cement Industry

In discussion with technology providers globally

Alternate Fuel

Oxyfuel

Electric
Heating of Kiln

Solar
Calcination



Policy

- Single window clearance
- Resource facilitation such as land, water, electricity
- Adoption of cluster approach
- Framework for technology adoption

Finance

- Access to low cost finance
- Incentives such as grants, project finance, equity and debt finance

R&D

- Need for research in CCUS as technology nascent
- Urgent need for pilot studies
- Plant specific techno-economic evaluation
- Need for scalable technologies, given the size of the industry

Major Challenges

- Financial Viability
- Availability of Funds
- Technology

Carbon Markets

- Need to be introduced
- Baseline for Indian Cement Industry to be based on **global benchmark**
- **Floor price** to be in line with cost of capture and utilisation
- To be integrated with global carbon markets. Allowed to **trade globally**
- **Bilateral agreements** with companies in other countries for upfront sale of carbon offsets to be allowed.

